AMATEUR SATELLITE REPORT

AMSAT's Newsletter for the Amateur Space Program.

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(See last page for details)

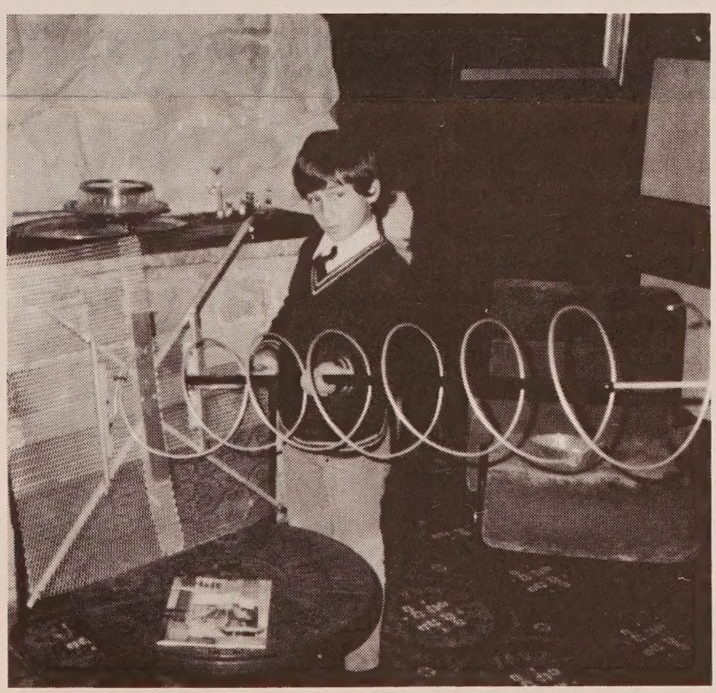
GAS Can Controller Project Undertaken

AMSAT has agreed to supply the primary controller for a Space Shuttle GAS (Get-Away Special) experiment package. The GAS package is a community sponsored project in the Texas cities of El Paso and Ysleta. It contains 12 experiments mostly in the Biological sciences.

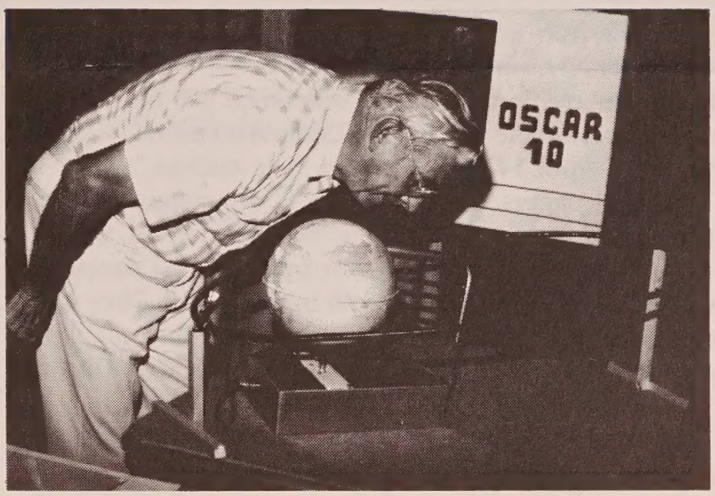
The experiment is the primary GAS package on STS 41-F, currently scheduled for launch August 9, 1984. This mission will be the second flight of Discovery, the third Orbiter in America's shuttle fleet.

The GAS experiment slot was originally obtained by the local Coors Beer distributor in 1977. The experiments are being designed and built by El Paso/Ysleta High School students. Technical advisors have been supplied by the local Gas and Electric companies. Funds and other support have been obtained from community members.

When the original supplier of the controller withdrew, El Paso/Ysleta put out a general call for help. AMSAT accepted the challenge of designing and building the required hardware in the few months remaining. The basic requirements of the controller match the requirements of the PACSAT low power portable ground station controller. An AMSAT team had already been formed to do that design, and the group had begun work on the Digital Communications Experiment, the DCE, which will fly as part of the University of Surrey's UoSAT-B satellite on March 1, 1984.



Harmonic of LU4ENQ with a 70-cm Helix antenna. The feed is directly over the perimeter at the rear and not through the center.

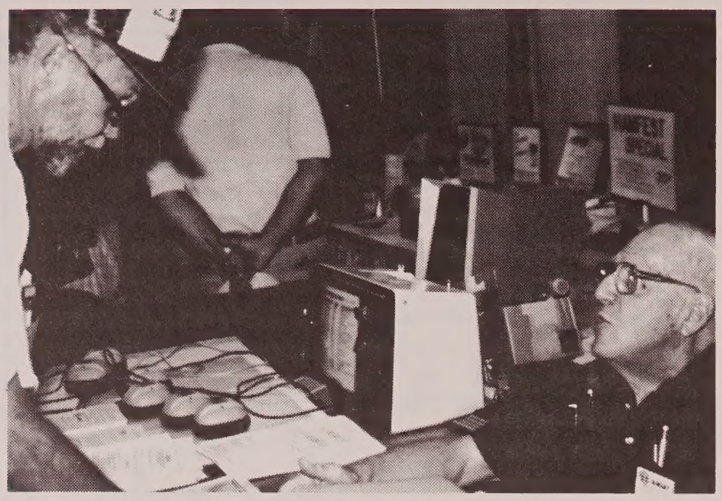


W6KAG with his AO-10 orbit model. It works!

The GAS controller will monitor and record the temperature in each of the 12 experiment compartments. The temperature will be controlled in some areas by switching a heater on and off. Several experiments require movements of an actuator, controlled by a stepper motor.

Although the GAS experiment does not relate directly to Amateur Radio, AMSAT will gain experience with the Shuttle and the GAS program. This experience will aid the PACSAT project which hopes to deploy from a GAS can in 1986. The controller design will be used for the low power portable PACSAT ground stations required by VITA, co-sponsor of the PACSAT project. Funding for the GAS controller will be supplied by the El Paso/Ysleta group.

The GAS controller will be built by AMSAT's PACSAT project. Lyle Johnson, WA7GXD, is the group leader for the controller project. Much of the work will be done by Bill Reed, WDØETZ, manager of PACSAT ground station design and his group in Dallas. Chuck Green, NØADI, will be involved in system design. Harold Price, NK6K will coordinate software activities. KA9Q spotted the plea for help on a computer bulletin board service.



W6CG, right, talks to a visitor at the ARRL S.W. Division Convention.

ARRL Sponsors Digital Conference

The American Radio Relay League will hold its Third Amateur Radio Computer Networking Conference on April 15, 1984 in Trenton, N.J. The conference will be held in cooperation with the 9th Trenton Computer Festival (TCF84) being held April 14-15 at Trenton State college.

Technical papers on many aspects of amateur packet radio, AMTOR, computer-based message systems, digital speech, presentation-level graphics and related Amateur Radio digital communications will be presented. They will cover communications via terrestrial, ionospheric, meteor-scatter and satellite media including AMSAT OSCAR 10 and PACSAT.

Topics addressed may include network and system architecture, proposed standards, hardware, software, protocols, modulation and encoding schemes, applications and practical experience. For further information contact Paul Rinaldo, W4RI, Technical Department Manager at ARRL HQ, 203-666-1541 or 225 Main Street, Newington, CT, 06111.

Eastern VHF Conference Slated For New Hampshire

The 10th Annual Eastern VHF/UHF Conference will be held May 4-6, 1984, at the Sheraton Tara, Exit 1, U.S. Route 3, Nashua, New Hampshire. The program features a Friday night hospitality room, technical talks by well-known VHFers, "rap sessions" for the various VHF/UHF bands, noise figure and antenna measurements and other activities. To preregister, send $14,50 to Rick Commo, K1LOG, 3 Pryor Rd, Natick, MA, 01760 before April 29. Registration at the door is $20.00. The Saturday night banquet is $15.00 also payable before April 29.

Room reservations should be made directly with the Sheraton Tara Hotel, Nashua. A block of rooms has been reserved for the conference. Be certain to mention the "Eastern VHF/UHF Conference" to gain access to this reserved block of rooms.

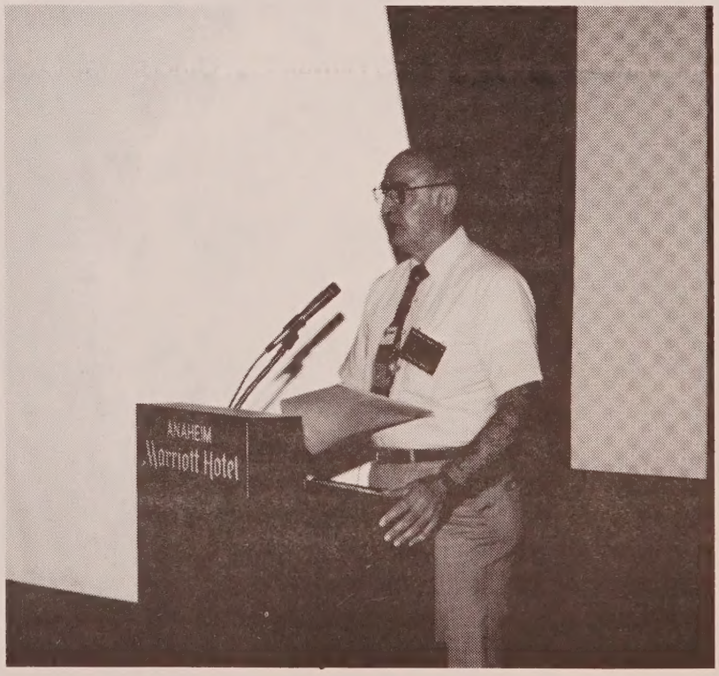
Conference Chairman in Tom Kirby, W1EJ. Inquiries may be addressed to Lewis D. Collins, W1GXT, 10 Marshall Terrace, Wayland, MA, 01778. If you prefer you may telephone at 617-358-2854 before 10:00PM Eastern time, please.

Manual Tracking Systems Popular

The Satellipse Phase III tracker by K2ZRO is selling well according to the inventor, Kaz Deskur. The manual tracking device provides accurate antenna pointing information together with an informative view of coverage areas, LOS, AOS times, etc. Kaz advises that he will provide a specially designed graph for anyone who sends an SASE to him. The graph provides the argument of perigee parameter if you know the latitude of apogee for AO-10. The Project OSCAR calendar provides an enumeration of all AO-10 apogees for 1984. It gives date and time as well as latitude and longitude of the apogee. Given the Project OSCAR calendar and the K2ZRO Satellipse, one has a complete AO-10 tracking package for the entire year. Project OSCAR will be inclosing the K2ZRO graph (latitude to argument of perigee converter) in all future mailings of the Project OSCAR Calendar. The calendar also contains the complete year's reference orbits for RS-5, 6, 7, and 8. The K2ZRO Satellipse is $10 postpaid North America to ZRO Technical Devices, P.O. Box 11, Endicott, N.Y., 13760. The Project OSCAR Calendar is available for $10 postpaid (North America) from Project OSCAR, P.O. Box 1136, Los Altos, CA, 94022. Both Project OSCAR and ZRO Technical Devices contribute directly to AMSAT. They deserve your support.

AO-10 Glitch Tests Command Team

An unexpected glitch associated with the sun angle sent a chill through the AO-10 command team late in January. On Monday, 30 January VE1SAT noticed a very strange series of readings in the PSK telemetry. He notified several other team members who then instituted an international contingendy management team bridging three continents. Using electronic mail and the message forwarding capability of AO-10, the team was quickly able to ascertain that the problem had to do with the angle of the sun as seen by the sun sensors. There may have been some glint from one of the antennas or perhaps an uncharted internal reflection in the sun sensor. In any case the IHU (Integrated



W6SP speaking at the S.W. Division (ARRL) Convention.

Housekeeping Unit) was "confused" by the glint and gave a series of anomalous readings leading to the alert by the command team. Most serious of the indications was one which pointed to serious BCR Battery Charge Regulator malfunction. Fortunately this and another bogey indication (the spin rate) were all artifacts of the odd sun sensor output. DJ4ZC quickly determined a fix (lowering sensor trigger threshold) and AO-10 was back in shape. The contingency team stood down and the spacecraft was back in order the next day none the worse for wear. This, the second unexpected glitch, was handled quickly and again demonstrated the tremendous versatility of both the spacecraft and the command structure (executed through the DJ4ZC-developed IPS language.). The prior contingency developed when certain software "fuses" tripped out on 30 Sep 83. (See *ASR* #64).

Short Bursts

• Southern Ohio has a new area coordinator. Richard Burgraff, W8PGP, is new on the AMSAT team. Welcome! Somehow we missed mentioning that an ol' veteran has put on an Area Coordinator's hat, too. Bill "Shep" Shepherd, W4AUZ, of Lexington was appointed Area Coordinator for Kentucky last Autumn. How'd we miss that one, Shep? Sorry, Welcome aboard in any case!! (And thanks!)

• Another veteran Area Coordinator and former OSCAR commander, Bud Schultz, W6CG, spent a few days in the hospital last week. Bud had been suffering fainting spells and a serious lapse required the unplanned stay for observation. Doctors suspect a mild stroke caused by arterial blockage in the neck. Meanwhile Bud had returned home to rest. Problem is the ol' Dutchman won't sit still for too long and is fretting about getting the bulletins on AO-10 (see *ASR* #70, page 2). W6KAG is picking up the slack. Your QSL card to W6CG will certainly cheer up Bud's spirits. Mail to Bud Schultz, 3050 Ball Rd #154, Anaheim, CA, 92804.

• Nearly 22,000 QSOs had been logged by the RS-5 and 7 robots by late last year. USA had 9172, USSR 5764, Japan 2479, Federal Republic of Germany 2434, Great Britain 1746, Canada 1298, France 1149, Poland 786, Italy 757, Netherlands 595, Spain 472, Hawaii 152. Others: Africa 180, South America 205. Tks UA3CR, G3IOR, W8GQW.

• The new book, *Satellite Experimenter's Handbook* is selling out as quickly as copies become available; looks to be among the years best sellers in the Amateur Radio world. This masterpiece has been getting rave reviews by virtually every aspect of amateur satelites and some aspects of commercial and scientific ones too. The work by former AMSAT Director Martin Davidoff, K2UBC, is available from AMSAT HQ for $10, postpaid in North America. Order your's today while copies last!

• The AMSAT sustaining Life Member program is a winner according to General Manager Bill Lazzaro, N2CF. A $15 donation garners the donor the rank of Sustaining Life Member and is recognized by a distinguished SLM pin.

• The graphics software from GM4IHJ has arrived in the U.S. and is being prepared for distribution through the AMSAT Software Exchange. It runs on a Timex Spectrum 2000 and was demonstrated by G3IOR at the Space Symposium last November. Watch for price and availability on this premium software package soon.

• A DXpedition to the very rare Andaman Islands (Bay of Bengal south of Burma) is planned by VU2GDG. The operation over the next 2 to 3 months will include AO-10 operations. On the down side, the recent announcement of a Clipperton DXpedition including AO-10 operations has been overtaken by a second announcement scuttling the prior plans. Word is that equipment procurement problems stalled the plans. Meanwhile, UA3CR was worked by several on RSs under the call EK0DTD. Finally, W1NU reports having worked V2AZH, HI1RCD and CX3AM on the RS birds.

• W1BIH, John will continue his operation from PJ2 until April. QSL through W1KDD.

• Technical articles are needed for *ORBIT*. Send to Harold Winard, Editor, P.O. Box 575, Wharton, N.J. 07885.

• The new version of the ARRL movie, "Amateur Radio's Newest Frontier" including new footage of the W5LFL Ham-In-Space mission was debuted in Los Angeles in early February. Copies are available from ARRL HQ. The AMSAT video tape library administered by WBØGAI will have copies available for loan soon.

More DX Showing Up On AO-10

As announced in *ASR* #69, *ASR* will occasionally publish a list of country/prefixes which have been active on AO-10. The following is the first occasion. Thanks go to G3IOR, W8DX, WH6AMX, WØTT and WØCY for sharing their "scorecards" with us!

A7, CE, CEØA, CT, CX (imminent ops by LU1ACH a/o 12 Feb 84 reported by LU4ENQ), DJ/DK/DL, DU, EA, EA8, EI, F, FC, FK8, FM, G, GI, GJ, GM, GW, HB, HB0, HC, HG, HL, HZ, H44, I, JA, JY, K,W,N, KG4, KG6, KL7, KP2, KP4, KV4, LA, LU, LX, OE, OH, OK, ON, OY, OZ, PA, PJ2, PY, P2, SM, SP, SV, TI, TR, TU, UA1,3,4, UA9,0, UB, UL7, VE, VK, VP2, VP8, VP9, VS6, VU, V3, WH6, XE, YB, YO, YU, YV, Y2, ZD8, ZK2, ZL, ZS, Z25, ZS3, 3A, 3D2, 4U1, 4X, 5N8, 9H1, 9M2, 9Y4.

That makes 89. Additional inputs are welcome.

K8OCL and KA8MVA plan to modify this 4-meter dish (TVRO) for Mode-L.

AO-10 Apogees

Mon Feb 20 09:30:14 1984 UTC	23.7N	12.5W		Sat Feb 25 06:05:23 1984 UTC	23.9N	34.5E
Mon Feb 20 21:09:45 1984 UTC	23.7N	172.2E		Sat Feb 25 17:44:54 1984 UTC	23.9N	140.8W
Tue Feb 21 08:49:16 1984 UTC	23.7N	3.1W		Sun Feb 26 05:24:24 1984 UTC	24.0N	43.9E
Tue Feb 21 20:28:47 1984 UTC	23.8N	178.4W		Sun Feb 26 17:03:55 1984 UTC	24.0N	131.3W
Wed Feb 22 08:08:18 1984 UTC	23.8N	6.3E		Mon Feb 27 04:43:26 1984 UTC	24.0N	53.4E
Wed Feb 22 19:47:49 1984 UTC	23.8N	169.0W		Mon Feb 27 16:22:56 1984 UTC	24.0N	121.9W
Thu Feb 23 07:27:19 1984 UTC	23.8N	15.7E		Tue Feb 28 04:02:27 1984 UTC	24.1N	62.8E
Thu Feb 23 19:06:50 1984 UTC	23.9N	159.6W		Tue Feb 28 15:41:58 1984 UTC	24.1N	112.5W
Fri Feb 24 06:46:21 1984 UTC	23.9N	25.1E		Wed Feb 29 03:21:28 1984 UTC	24.1N	72.2E
Fri Feb 24 18:25:52 1984 UTC	23.9N	150.2W		Wed Feb 29 15:00:59 1984 UTC	24.1N	103.1W

From KA9Q

```
Satellite: rs-3
Catalog number: 12997
Epoch time:       84012.08152795
   Thu Jan 12 01:57:24.149 1984 UTC
Element set:      87
Inclination:        82.9589 deg
RA of node:        220.1686 deg
Eccentricity:     0.0058668
Arg of perigee:    317.2135 deg
Mean anomaly:       42.4376 deg
Mean motion:    12.15583992 rev/day
Decay rate:           4e-08 rev/day^2
Epoch rev:             9183
Semi major axis:  7987.344 km
Anom period:     118.461580 min
Apogee:           1665.778 km
Perigee:          1572.058 km

Satellite: rs-4
Catalog number: 13000
Epoch time:       84020.48176816
   Fri Jan 20 11:33:44.769 1984 UTC
Element set:      170
Inclination:        82.9268 deg
RA of node:        222.8474 deg
Eccentricity:     0.0018384
Arg of perigee:     19.3347 deg
Mean anomaly:      340.8403 deg
Mean motion:    12.06669295 rev/day
Decay rate:           4e-08 rev/day^2
Epoch rev:             9215
Semi major axis:  8026.662 km
Anom period:     119.336757 min
Apogee:           1665.582 km
Perigee:          1636.070 km

Satellite: rs-5
Catalog number: 12999
Epoch time:       84012.04300232
   Thu Jan 12 01:01:55.400 1984 UTC
Element set:      140
Inclination:        82.9565 deg
RA of node:        228.6352 deg
Eccentricity:     0.0011580
Arg of perigee:     65.8132 deg
Mean anomaly:      294.4149 deg
Mean motion:    12.05042100 rev/day
Decay rate:           4e-08 rev/day^2
Epoch rev:             9101
Semi major axis:  8033.890 km
Anom period:     119.497900 min
Apogee:           1682.576 km
Perigee:          1663.970 km
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Satellite: rs-6
Catalog number: 13002
Epoch time:       84008.06605693
   Sun Jan  8 01:35:07.319 1984 UTC
Element set:      71
Inclination:        82.9596 deg
RA of node:        224.0269 deg
Eccentricity:     0.0050499
Arg of perigee:    343.1632 deg
Mean anomaly:       16.7752 deg
Mean motion:    12.13557899 rev/day
Decay rate:           4e-08 rev/day^2
Epoch rev:             9117
Semi major axis:  7996.238 km
Anom period:     118.659357 min
Apogee:           1660.240 km
Perigee:          1579.480 km

Satellite: rs-7
Catalog number: 13001
Epoch time:       84007.53970377
   Sat Jan  7 12:57:10.406 1984 UTC
Element set:      139
Inclination:        82.9560 deg
RA of node:        228.1470 deg
Eccentricity:     0.0022468
Arg of perigee:      5.3765 deg
Mean anomaly:      354.7537 deg
Mean motion:    12.08675623 rev/day
Decay rate:           4e-08 rev/day^2
Epoch rev:             9074
Semi major axis:  8017.771 km
Anom period:     119.138665 min
Apogee:           1657.825 km
Perigee:          1621.796 km

Satellite: rs-8
Catalog number: 12998
Epoch time:       83361.06812312
   Tue Dec 27 01:38:05.838 1983 UTC
Element set:      256
Inclination:        82.9584 deg
RA of node:        238.8709 deg
Eccentricity:     0.0019230
Arg of perigee:    144.2347 deg
Mean anomaly:      216.0067 deg
Mean motion:    12.02939248 rev/day
Decay rate:           4e-08 rev/day^2
Epoch rev:             8893
Semi major axis:  8043.256 km
Anom period:     119.706793 min
Apogee:           1687.774 km
Perigee:          1656.839 km
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Satellite: oscar-8
Catalog number: 10703
Epoch time:       84017.48624232
   Tue Jan 17 11:40:11.336 1984 UTC
Element set:      828
Inclination:        98.7525 deg
RA of node:         24.8485 deg
Eccentricity:     0.0006957
Arg of perigee:     99.2279 deg
Mean anomaly:      260.9688 deg
Mean motion:    13.96591353 rev/day
Decay rate:         -1.7e-07 rev/day^2
Epoch rev:            29915
Semi major axis:  7280.951 km
Anom period:     103.108185 min
Apogee:           928.224 km
Perigee:          918.094 km

Satellite: oscar-9
Catalog number: 12888
Epoch time:       84021.36801483
   Sat Jan 21 08:49:56.481 1984 UTC
Element set:      572
Inclination:        97.5728 deg
RA of node:        353.9956 deg
Eccentricity:     0.0001023
Arg of perigee:    264.0951 deg
Mean anomaly:       96.0190 deg
Mean motion:    15.24175143 rev/day
Decay rate:         2.733e-05 rev/day^2
Epoch rev:            12701
Semi major axis:  6868.367 km
Anom period:      94.477331 min
Apogee:           511.716 km
Perigee:          510.311 km

Satellite: oscar-10
Catalog number: 14129
Epoch time:       84015.27200481
   Sun Jan 15 06:31:41.216 1984 UTC
Element set:      75
Inclination:        25.8148 deg
RA of node:        220.4854 deg
Eccentricity:     0.6087206
Arg of perigee:    237.1847 deg
Mean anomaly:       49.5265 deg
Mean motion:     2.05849943 rev/day
Decay rate:          9.2e-07 rev/day^2
Epoch rev:               444
Semi major axis: 26106.090 km
Anom period:     699.538693 min
Apogee:          35622.124 km
Perigee:          3839.494 km
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